

## СПИСЪК

### РЕЗЮМЕТА НА ТРУДОВЕТЕ СЛЕД ЗАЩИТА НА ДОКТОРСКА ДИСЕРТАЦИЯ НА Д-Р ДИЯНА ИВАНОВА ВЛАДОВА

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Стара Загора

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## Durable Preservation of Feline Cardiac Structures Via Plastination Methods

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Plastinated semi-transparent slices of cat cardiac structures were obtained. The slices processed according to the E12 plastination technique, are with dark yellow to light brown colour, whereas those plastinated with Biodur S10 – light yellow with clear details, P40 plates are nearly completely transparent, but with a light yellowish taint.

*Key words:* plastination, Biodur, sheet, slices, heart

### Introduction

This experiment is part of a complex research of cardiac structures in the cat and represent a coordination approach for comparison and control of the correct interpretation of data obtained by other experimental techniques. Plastination is a method for a preservation of perishable biological specimens – whole organs or parts of them [8, 9]. These techniques use silicone Biodur S10 for plastination of whole organs [3, 4], epoxy resin Biodur E12 for preparation of body slices [1, 6, 7, 11] and polyester resin P40 – for brain sheet plastination [2, 5, 10] to obtain durable preparations that are safe for human health and are practically permanent [8].

The aim of the study was the visualization of cardiac structures by means of plastination technologies. The following tasks were performed with regard to achieve our aim: 1. To specify the type of necessary anatomical structures; 2. To determine the plastination method for processing of anatomical specimens; 3. To select the protective material that should be used for obtaining durable results.

### Material and Methods

The experiment was performed with four male cats conforming to all animal welfare regulations. After perfusion with 10% formalin and freezing at  $-35^{\circ}\text{C}$ , the thorax of

*Original Article*

**INVESTIGATION OF ANIMAL BONE MATERIALS DISCOVERED IN  
NEOLITHIC SETTLEMENT NEAR THE DISTRICT HOSPITAL IN STARA  
ZAGORA**

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**Summary**

The bone material was studied and the species of origin were identified. The following methods of analysis were used: osteometric method, method for determining the minimum number of individuals, method for identifying the species of sheep and goat bones. A total number of 3237 bone fragments of wild and domestic animals were analyzed and identified. They belonged to at least of 1 994 individuals. In this investigation, the bones of wild mammals make up 317 or 9.79% of the total number of bones, and these of domestic animals 2 917 or 90.11%.

**Key words:** archaeosteology, paleontology



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## STRUCTURAL AND HISTOCHEMICAL STUDIES ON HEART VENTRICLE WALL IN THE CAT

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### SUMMARY

Material from the heart ventricles of 6 sexually mature domestic cats was used in the present study. The material was processed by conventional histological and histochemical methods. Histological preparations were formalin- paraffin histoslices stained with haematoxylin (according Erlich) - eosin. Paraffin slices from material fixed in Carnua's solution were stained with Maurice alcian blue, followed by a PAS reaction for viewing free and conjugated polysaccharides. Differentiation of glycosaminoglycans was done by histochemical tests using alcian blue at pH 1.0 and pH 2.5. The light microscopic study of the heart ventricle walls in the cat showed structural identity compared with that of other mammalian species. Histochemical reactions established that the heart ventricle myocardium contains both free polysaccharides (glycogen) and glucosaminoglycans of the non-sulphate type.

**Key Words:** cat, heart, structure, histochemistry.



*Original Contribution*

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**MOLLUSCS (*Mollusca: Gastropoda, Bivalvia*) FROM THE AZMASHKA  
MOUND, UPPER TRAKIA PLAIN, SOUTH BULGARIA**

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**ABSTRACT**

A total of 73 mollusc shells from the Azmashka Mound, from the Neolithic and Eneolithic ages were studied. Two gastropod species: *Helix figulina* (50 specimens), *Helix lucorum* (escargot) (1 specimen) and two bivalve (*Bivalvia*) species (one freshwater and one marine) – *Unio pictorum* (painter's mussel) (21 specimens) and *Cerastoderma glaucum* (lagoon cockle) (1 specimen) have been investigated. The gastropods found in the Azmashka Mound were probably not used as food source by the population. The relatively high share of naturally occurring *Helix figulina* shells indicated the presence of open fields with *drought* tolerant herbs and shrubs. The species *Helix lucorum* was represented by only one specimen that probably represented a worked up shell of unknown purpose, possibly a jewel. The freshwater species, *Unio pictorum*, was the commonest, and it was probably used as a foodstuff but also as a tool. The lines of effacing on the lower valve border clearly indicated that shells were moved transversely to their lengths, suggesting their use for mechanical abrasion of certain surfaces. The shell of the marine lagoon cockle *Cerastoderma glaucum* was used as a jewel, as evidenced by the opening in its upper part consequently to effacing.

**Key Words:** Azmashka, mollusk, neolith, eneolith

ИЗСЛЕДВАНЕ НА ЖИВОТИНСКИ КОСТЕН МАТЕРИАЛ  
ОТ МОГИЛЕН НЕКРОПОЛ “ТРИЪГЪЛНИКА” КРАЙ  
ГРАД НОВА ЗАГОРА

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**Summary**

Kostov, D. & D. Vladova, 2009. Analysis of animal bone material from hill necropolis “The Triangle” nearby town of Nova Zagora. *Bulg. J. Vet. Med.*, 12, Suppl. 1, 11–18.

During excavation works of hill necropolis “The triangle” nearby town of Nova Zagora skeletons of 6 relatively young horses were found and investigated. They were buried in two ditches – one female riding horse and two male draught horses in each ditch. During the ritual funeral chariots were first put in the burial place and then the mortified horses. Fracturation of frontal bones, found in all investigated skeletons, supposes ritual killing of the animals by a strike in the forehead region. All horses were buried in lateral recumbency position, except one – in ventral recumbency. Analysis of osteological material reveals scars caused by sharp object on the leg bones, which are in position of strong flexion, result of cutting the tendons.

**Key words:** animal bone material, hill necropolis

**УВОД**

Траките са етнокултурна общност от индоевропейски племена. В периода от средата на II хил. пр. Хр. до VI в. сл. Хр. са населявали областта от североегейското крайбрежие до Карпатите, Черноморското крайбрежие и земите в северозападна Мала Азия. Всички находища от това време са изключително важни, защото траките не са оставили никакви писмени документи. За тях се съди по оскъдните записки водени от техните съседи гърци и римляни, според които траките са притежавали добри познания в металообработването, както и че са били умели бойци, отлични ездачи и животновъди. В подкрепа на това са откритите при разкопки добре изработени златни и сребърни пръстени,

съдове, шлемове и щитове с орнаменти, както и колесници за транспорт, състезателни и товарни (Venedikov, 1960). Заедно с откритите колесници са намерени и скелети от различни животни, убивани и загробвани, съответствашо тракийските погребални ритуали (Nikolov, 1961; Meschekov, 2001; Ribarov, 2004; Momchilov, 2005). Оскъдни са данните, относно начина на умъртвяване и полагане на животните в ямите (Venedikov, 1960; Georgieva & Momchilov, 2000; Georgieva & Momchilov, 2002; Ignatov, 2007).

Настоящото проучване цели изследване на животинския костен материал, открит при разкопките на могилен некропол “Триъгълника” край гр. Нова Загора, което би допринесло за обо-



**ULTRASTRUCTURAL LOCALIZATION OF PROTEIN GENE PRODUCT 9.5 AND NEURON SPECIFIC ENOLASE IN THE NORMAL DOG PROSTATE**

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**ABSTRACT**

Five healthy dogs of unspecified breed, aged between 1.5 and 5 years, weighing 20 kg were used for this study. Routine electron microscopy and immunohistochemistry for protein gene product (PGP) 9.5 and neuron specific enolase (NSE) were performed. Neuroendocrine cells in clinically healthy dogs with a normal prostate were differentiated and investigated. They represent the third type of epithelial cells together with the luminal and basal cells. Slight immunoreactivity for PGP 9.5 and NSE in the neuroendocrine cells and in the nerve fibres running throughout the prostate was established. Conversely, the smooth muscle cells, myoepithelial cells, stromal cells as well as the parenchyma of the normal dog prostate were immunonegative for both studied peptides.

**Key words:** protein gene product 9.5, neuron specific enolase, electron microscopy, immunohistochemistry, prostate, dog

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**COMPARATIVE GENDER-RELATED ANALYSIS OF THE LOCALIZATION OF TISSUE ALKALINE AND ACID PHOSPHATASE EXPRESSION IN THE URETHRA IN DOMESTIC CATS (*FELIS SILVESTRIS CATUS*)**

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**ABSTRACT**

**AIM:** Detection of the presence of acid and alkaline phosphatase, whose tissue expression indicates the course of normal and pathological events in the urethra, as well as gender-related peculiarities in the activities of studied enzymes in this anatomical area.

**MATERIAL AND METHODS:** The pelvic urethra from six male cats and the urethra of six female cats, all clinically healthy and sexually mature. The expression of acid and alkaline phosphatase was detected by Gomori staining.

**RESULTS:** The enzyme histological investigation of pelvic urethra in male cats showed that the most significant localization of acid phosphates activity was observed in the propria and adventitia of pelvic urethra, followed by apical parts of epithelial cells in disseminated part of the prostate and in the lumen of glandular tubules. In the lumen of disseminated prostatic alveoles, no alkaline phosphatase activity was detected.

In female cats, the strongest acid phosphatase activity was established in the connective tissue located among skeletal muscle fibres, followed by a slightly detectable enzyme expression in the propria and perivascular areas of the urethra, whereas alkaline phosphatase activity was present in the connective tissue among skeletal muscle fibres. In the other connective tissue elements of the urethra and its epithelium, female cats exhibited no alkaline phosphatase activity.

**CONCLUSION:** The lack of tissue alkaline and acid phosphatase activity in urethral propria in female cats was considered as a proof for the absence of structures, resembling a female prostate.

**Key words:** alkaline phosphatase, acid phosphatase, urethra, cat.

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**COMPUTED TOMOGRAPHY IMAGING OF THE TOPOGRAPHICAL ANATOMY OF CANINE PROSTATE**

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**ABSTRACT**

**AIM:** To investigate the topographical anatomy of canine prostate gland by computed tomography (CT) for diagnostic imaging purposes.

**MATERIAL AND METHODS:** Seven clinically healthy mongrel male dogs at the age of 3–4 years and body weight of 10–15 kg were submitted to transverse computerized axial tomography (CAT) with cross section thickness of 5 mm.

**RESULTS:** The CT image of canine prostate is visualized throughout the scans of the pelvis in the planes through the first sacral vertebra (S1) dorsally; the bodies of iliac bones laterally and cranially to the pelvic brim (ventrally). The body of prostate appears as an oval homogenous relatively hypo dense finding with soft tissue density. The gland is well differentiated from the adjacent soft tissues.

**CONCLUSION:** By means of CT, the cranial part of prostate gland in adult dogs aged 3–4 years exhibited an abdominal localization.

**Key words:** prostate gland, computed tomography, dog.

**MORPHOLOGY AND ULTRASONOGRAPHY OF THE PERICARDIAL AND EPICARDIAL ADIPOSE TISSUE IN HEALTHY RABBITS (*Oryctolagus cuniculus*)**P. Yonkova<sup>1</sup>, D. Vladova<sup>2</sup>, R. Dimitrov<sup>1</sup>, A. Rusenov<sup>3</sup>, D. Zaprjanova<sup>4</sup>, P. Atanassova<sup>5</sup>, M. Stefanov<sup>2</sup><sup>1</sup>Department of Veterinary Anatomy, Histology and Embryology, Faculty of Veterinary Medicine, Trakia University, Stara Zagora, Bulgaria<sup>2</sup>Department of Morphology, Physiology and Nutrition of Animals, Faculty of Agriculture, Trakia University, Stara Zagora, Bulgaria<sup>3</sup>Department of Internal diseases, Faculty of Veterinary Medicine, Trakia University, Stara Zagora, Bulgaria<sup>4</sup>Department of Pharmacology, Physiology of Animals and Physiological Chemistry, Faculty of Veterinary Medicine, Trakia University, Stara Zagora, Bulgaria<sup>5</sup>Department of Anatomy, Histology and Embryology, Medical University, Plovdiv, Bulgaria**ABSTRACT**

Rabbits develop a visceral type obesity and therefore is exceptionally suitable as a model for lipid metabolism investigation. Ten clinically healthy New Zealand White rabbits from both genders, weighing from 3.5 to 3.7 kg were used. The blood plasma concentrations of total cholesterol and triglycerides were  $1.45 \pm 0.15$  mmol/L and  $0.63 \pm 0.01$  mmol/L, respectively. The highest amount of pericardial adipose tissue was observed around the free surface of the right ventricle and the apex of the heart. The average mass of pericardial adipose tissue was  $3.72 \pm 0.24$  g (0.1% of body weight and 47% of heart weight). By ultrasonography, pericardial adipose tissue was visualized as a moderately echoic homogeneous structure against the hyperechoic myocardium of the right ventricle. Its thickness was  $3.2 \pm 0.26$  mm. The results of the present study showed that the rabbit was a suitable model for monitoring of quantitative changes in visceral fat depots in mammals, allowing their study in vivo by ultrasonography instead of utilizing dissection.

**Key words:** rabbits, pericardial adipose tissue, epicardial adipose tissue, ultrasonography

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## TONSILLA PARAEPIGLOTTICA IN THE BULGARIAN WHITE × LANDRACE PIG CROSSES - MORPHOLOGICAL TRAITS AND SOME MORPHOMETRICAL INVESTIGATIONS

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### ABSTRACT

The data about the topography and morphology of the paraepiglottic tonsil (*tonsilla paraepiglottica*; TPE) in pigs are not enough. The purpose of the present investigation was to determine its topography, morphological traits and some morphometric parameters in Bulgarian White × Landrace pig crosses. It was found that TPE was situated in pars laryngea pharyngis, dorsolaterally to vallecule epiglottica on the lateral surface of lig. thyroepiglotticum. It is a paired macroscopically visible formation with grooves and the following dimensions (mean ± SEM): length – 15.8±0.4 mm in male and 16.2±0.4 in female; width – 8.3 ± 0.1 mm in male and 8.2±0.1 mm in female. The shape of the tonsil is mainly elliptical, and in some instances – oval. It is sharply delineated and protruded over the adjacent tissues.

On longitudinal sections, the number of lymph nodules was 75.0±0.9 in male and 76.2±0.9 in female pigs, whereas on transverse sections – 33.4 ± 0.9 and 34.9±0.9 respectively. The stratified epithelium of the tonsil located on the part of recessus piriformis, was infiltrated with lymphocytes at some areas. The tonsillar crypt numbers on longitudinal sections were 6.6±0.2 and 6.8±0.2 in male and female pigs, respectively, and on transverse sections - 6.5 ± 0.1 (male) and 6.4±0.1 (female). The base of the tonsil was differentiated from adjacent tissues by a well-defined connective tissue capsule.

**Key words:** paraepiglottic tonsil, lymph nodules, pig crosses

## **LOCALIZATION AND SHAPE OF BASAL CELLS IN FELINE PROSTATE GLAND**

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### **ABSTRACT**

**PURPOSE:** To study the localization and the shape of basal cell in the prostate gland of the cat with regard to assist the understanding of their role in the pathogenesis of benign and malignant lesions in this animal species.

**MATERIALS AND METHODS:** The prostate glands of 12 sexually mature, clinically healthy male European Shorthair cats at the age of 1–2 years, weighing 2.8 to 4 kg were investigated. The localization and the shape of basal cells were determined in semi-thin and ultrathin cross sections by light and transmission electron microscopy.

**RESULTS:** Epithelial basal cells in feline prostate alveoli did not attain the alveolar lumen and formed an incomplete, discrete boundary layer, located in close vicinity to the basal membrane. These cells are observed as an occasional and rare epithelial population in the alveolar part of feline prostate parenchyma. The shape of alveolar basal cells varied from oval and triangular to irregular.

Basal cells were also observed in the epithelium of prostate excretory ducts that also formed a discontinuous incomplete boundary layer. The basal cells are a sporadic finding in feline prostate ductal epithelium. The shape of ductal basal cells is also variable. The invaginations of the karyolemma in irregularly-shaped cells were observed. Secretory-like granules were observed in the cytoplasm of basal cells.

**CONCLUSION:** For the first time, two types of basal cells have been described in feline prostate gland depending on their localization: alveolar and ductal.

**Key words:** prostate, basal cells, cat.

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**DETERMINING THE TYPE OF NERVOUS SYSTEM IN YOUNG PUPPIES,  
REGARDING THEIR PROPER EDUCATION, SOCIALIZING, AND FUTURE  
BEHAVIOR FORMATION**

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**ABSTRACT**

We studied the behaviour of 24 young puppies of the Labrador, Boxer and German Shepherd breeds, by using a bait test, in order to determine the type of nervous system, and depending on that to apply the most appropriate training, socializing, and behaviour formation. We proved that the used test was quick, easy to perform, convenient to set up, and not stressful for the subjects as it complied with the requirements for humane treatment of animals. According to our results, Labradors were most courageous and stable, followed by the Boxers and the German Shepherds.

**Key words:** dog, behaviour, neural system, training, socialization

## **ULTRASONOGRAPHY-AIDED ANATOMICAL INVESTIGATION OF THE HEART AND SOME PELVIC ORGANS**

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### **Abstract**

VLADOVA, D. and M. STEFANOV, 2010. Ultrasonography-aided anatomical investigation of the heart and some pelvic organs. *Bulg. J. Agric. Sci.*, 16: 99-104

Echography or ultrasonography is commonly utilized in imaging anatomy and diagnostics of internal diseases; Echography has enhanced the process of diagnostics, increased the options for morphological and functional evaluation of organs, has replaced other techniques of examination and allowed the performance of diagnostic and therapeutic manipulations under real-time ultrasound-guided control. The ultrasonographic images depict the cross sectional anatomy of a given anatomical area or organ. Echocardiography is a technique using ultrasound for examination of the heart and the large blood vessels. The identification of cardiac structures and other organs is important for achieving a general picture, localization of a specific process and deviations from the normal image of the organ. Ultrasonography is a non-invasive technique for visualization of benign and malignant lesions of accessory sex glands in both animals and men. The early detection of abnormalities of prostate and bulbourethral glands in cats is essential for the normal reproduction in this carnivore species.

*Key words:* ultrasonography, imaging anatomy, thorax, pelvis, cat



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**СРАВНИТЕЛНИ МОРФОЛОГИЧНИ ПРОУЧВАНИЯ ВЪРХУ  
АРХЕОЛОГИЧЕН КОСТЕН МАТЕРИАЛ ОТ ГОВЕДО**

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**COMPARATIVE MORPHOLOGICAL STUDIES ON  
ARCHAEOLOGICAL BONE MATERIAL FROM CATTLE**

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**Abstract**

The purpose of this study was to investigate the microstructure of archaeological bovine bone material. For this purpose, 53 fragments and whole metacarpal bones (MS) of cattle belonging to adult individuals were tested and divided into groups as follows: early Neolithic, early Chalcolithic, late Chalcolithic and early Bronze. The morphological study of the bone material demonstrated no significant differences in the microstructure of bone tissue in various archaeological periods. The qualitative changes in the histological structure of the bones are not sufficient grounds for determining the species belonging to the bone and that requires an additional use of quantitative measurements of the osteons and havers channels. In the cattle osteons are determined in phase of interrupted growth.

**УВОД**

Разграничаването на фосили от дребни бозайници (вкл. човек), притежаващи така наречената хаверсова костна тъкан и тези от едри бозайници, притежаващи мрежеста (*plexiform*) костна тъкан е напълно възможно, както и на кости от свиня, говедо, коза, овца и кон, които имат смесена костна тъкан - хаверсова и мрежеста [2, 3, 6]. В случаите с еднакви типове костна тъкан, при определяне на вида животно, трябва да се прилагат както качествени, така и количествени хистоструктурни изследвания на костта [4]. Има сравнително малко научни публикации фокусиращи видовото диференциране на животните чрез използване на хистоморфометрични характеристики на компакната костна тъкан [1, 7] смята че е невъзможно да се направи диференциация между хистоструктурата на лъчевите и метакарпалните кости при говедото и свинята

## Computed Tomographic Imaging of Vesicular Glands in Rabbits

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**Abstract:** The study was carried out with the purpose to demonstrate the anatomo-topographic features of rabbit vesicular glands by computed axial tomography imaging (CT). Eight sexually matured, clinically healthy male white New Zealand rabbits, 12 months of age and weighing 2.8-3.2 kg were used. CT scans of the pelvis were performed in the transverse planes from the seventh Lumbar (L7) vertebra to the first Sacral vertebra (S1), with a section thickness of 2 mm. The cranial border of the vesicular glands was visualized in the transverse plane between L7 and S1 while the caudal part of the glands was observed in scans of the pelvic inlet in the transverse plane through the caudal part of S1. In the transverse scans of the pelvic inlet halfway S1, the vesicular glands appeared as transversely ovoid, homogeneous and relatively hypodense structures as compared to the adjacent soft tissues. The glandular areas were relatively hypodense compared to the urethral and rectal walls. The density of the rabbit vesicular glands was that of the soft tissues, ranging from  $31 \pm 0.33$  HU in precontrast imaging and  $78 \pm 0.33$  HU in postcontrast imaging.

**Key words:** Vesicular glands, imaging anatomy, rabbit, hypodense, Transversely ovoid, sacral vertebra

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**TRANSTHORACAL TWO-DIMENSIONAL  
ULTRASONOGRAPHIC ANATOMICAL STUDY OF  
THE HEART IN THE RABBIT (*Oryctolagus cuniculus*)**

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**ABSTRACT**

**PURPOSE:** Researching of the rabbit heart by two-dimensional transthoracal ultrasonography in order to data about the heart imaging anatomy and diagnostics of this animal be given. **OBJECTS:** Eight sexually mature, healthy New Zealand rabbits, aged 12 months with body weight from 2.8 kg to 3.2 kg were investigated.

**METHODS:** The animals were anesthetized and positioned in laying lateral left and right position. The trasducer was put in the places for imaging of standard planes from the heart image. **RESULTS:** At the imaging of the heart in right parasternal plane on its longitudinal axis, the ascending aorta was visualized as a hyperechoic finding, surrounded by the close heart structures. The image from the left parasternal plane on the longitudinal axis of the heart showed the both left heart cavities. The parasternal plane on the short axis of the heart was a transversal image, and the valvular apparatus was visualized.

**CONCLUSIONS:** Our results demonstrated that the two-dimensional transthoracal ultrasonographic study of the rabbit heart is a completely noninvasive and enough definitive method about the qualitative estimation of the normal heart structures.

**Key words:** imaging anatomy, echocardiography, rabbit

## ULTRASONOGRAPHIC QUALITATIVE CHARACTERS OF RABBIT SPLEEN (ORYCTOLAGUS CUNICULUS)

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### ABSTRACT

**AIM:** Finding some qualitative ultrasonographic features of normal rabbit spleen, in order to use the obtained results for imaging anatomical and diagnostic study of human and animal spleen lesions.

**MATERIALS:** We investigated 9 sexually mature, healthy white New Zealand rabbit, aged 8 months, weighed from 2.8 kg to 3.2 kg. The animals were anesthetized.

**METHODS:** The study was performed with Diagnostic Ultrasound System: model DC-6V Shenzhen Mindray Bio-Medical, Electronics CO. Ltd (CHINA). We used 6.5 MHz microconvex and 5 MHz linear probes. The animals were positioned in supine recumbency. The approach was left percutaneous transabdominal hypochondrial left. The spleen of four animals was extirpated, following euthanasia. The obtained preparations were investigated in liquid isotonic medium. **RESULTS:** In the sagittal ultrasonographic study, the spleen was with elongated oval shape. In the transversal one the organ's shape was triangular. The capsule was visualized as hyperechoic and heterogeneous striped finding. Parenchyma was hypoechoic, compared to the capsular structure. The blood vessels were visualized as oval anechoic findings. The investigation of extirpated spleen *post mortem* showed, that in sagittal aspect parenchyma is with homogeneous echogenicity. The capsule was relatively more hyperechoic and comparatively more homogeneous structure than parenchyma. **CONCLUSIONS:** The qualitative ultrasonographic data for the rabbit spleen could be used as biological model in the imaging anatomical and diagnostic studies of some human and animal spleen lesions.

**Key words:** spleen, anatomy, ultrasonography, rabbit

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## AGE MORPHOMETRY OF SOME INTERNAL ORGANS IN COMMON PHEASANT (*PHASIANUS COLCHICUS COLCHICUS*)

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### ABSTRACT

**AIM:** To determine some morphometrical parameters of colchis pheasant internal organs. **MATERIALS:** We studied 30 colchis pheasants, divided in three groups (each group was consisted of 5 males and 5 females) at 15, 17 and 19 weeks of age.

**METHODS:** Following euthanasia and evisceration, the digestive tract was separated in segments, corresponded to its different parts (esophagus, crop, proventriculus, gizzard, small intestine, caeca and rectum). The weight of digestive structures, heart, liver, spleen and testicles was determined by electronic scale and the length of the tubular digestive organs was measured with ruler and graph paper. The results were collected and recorded. The obtained data was processed via variable statistical methods.

**RESULTS:** The body weight of the female birds was significantly lower than that of the male ones. In males the gizzard's percent decreased significantly through the whole investigative period. The proventriculus and heart proportions were almost the same with age advancing. Females were with heavier livers and spleens than males, but the spleen difference was without statistical significance. The length of the crop, esophagus and intestines had lower values in males, compared to females

**CONCLUSION:** The older male and female pheasants had significantly shorter tubular digestive organs. The youngest male individuals had heavier liver, compare to the females. These alterations of the morphometrical parameters in the pheasant internal organs are provoked by sex dimorphism influence.

**Key words:** morphometry, internal organs, pheasant

## **ANATOMICAL COMPUTED TOMOGRAPHIC STUDY OF THE HEART AND SOME MEDIASTINAL VESSELS OF THE RABBIT (*Oryctolagus cuniculus*)**

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### **Abstract**

DIMITROV, R., D. VLADOVA, K. STAMATOVA, D. KOSTOV and M. STEFANOV, 2012. Anatomical computed tomographic study of the heart and some mediastinal vessels of the rabbit (*Oryctolagus cuniculus*). *Bulg. J. Agric. Sci.*, 18: 784-788

The aim of the study is to utilize the computed tomography the anatomical study of the rabbit heart and some of its mediastinal vessels.

We investigated seven sexually mature, healthy male white New Zealand rabbits, aged 12 months. The animals were anesthetized. The bodies of the thoracic vertebrae were used as bone markers when performing the imaging.

At the level of the third and fourth thoracic segment were found only vascular structures. At the fifth thoracic vertebrae a partial heart silhouette was observed, and the complete one – at the seventh. At the third, fourth and fifth thoracic vertebrae an image of the ascending aorta was found, at the third and fourth one – aortic arch, at the fifth segment – the beginning of the descending aorta.

The results confirm the thesis, that the rabbit is a suitable biological model for morphological and functional studies of the heart.

*Key words:* imaging anatomy, computed tomography, rabbit heart

## Some Heavy Metals' Concentrations in the Metacarpal Bones of Paleontological Cattle from Azmashka Settlement Hill

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### Abstract

The aim of the present study was to investigate and determine concentrations of some heavy metals in the cattle metacarpal bones, found from Azmashka settlement hill. They belonged to four periods: Early Neolith (EN), Early Halkolith (EH), Late Halkolith (LH) and Early Bronze (EB). The natural bone material was obtained from the archaeological site Azmashka village mound, found 6 km east of Stara Zagora (Bulgaria) and also from the territory of Hrishteni village, following radiocarbonic analysis. In the sampling an atomic absorption spectrophotometry was used. The samples have been burned dry and dissolved in acid until solution with optimal element concentration. Higher concentrations of iron (Fe), copper (Cu), zinc (Zn), manganese (Mn), lead (Pb), chrome (Cr) and magnesium (Mg) were observed. The quantity of Fe, Cu, Zn, Mn and Pb were with higher values at Early Halkolith, compared to the same in the other periods. The highest heavy metals' concentrations were found, as following: iron, cooper, manganese, lead – at Early Halkolith and zink, chrome and magnesium – at Late Halkolith. The lowest heavy metals' concentrations were found, as following: iron, manganese, chrome, magnesium – at Early Neolith and cooper, zink and lead– at Early Bronze. Differences in the other elements' concentrations from the studied periods weren't significant. Qualitative differences influenced by the heavy metals in the bone structure weren't found. The content of heavy metals in the studied metacarpal bone material is considerably high compare to the normal values, mentioned by some researchers studied other species. The trend of concentration increasing is from Early Neolith to Early Bronze. This is due to the metacarpal bone contamination with soil, as which has been polluted from many years by the industrial manufacture of the nitrogen fertilizer.

**Key Words:** Heavy metal, bones, osteoarchaeology

## Light microscopy of the adipose tissue distribution along the coronary branches in the myocard of the New Zealand White rabbit

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**Abstract.** *The New Zealand White rabbit (*Oryctolagus cuniculus*) is bred as a laboratory animal, pet and last but not least for meat production. It is prone to accumulating a lot of fat and muscle. The aim of the study is to examine the morphological nearness of the myocardial coronary branches with adipocyte depots in rabbits by means of optical microscopy. Histological preparations were made from the walls of rabbit hearts and were studied through light microscopy. The spread of adipose tissue along the coronary branches in the cardiac muscle was examined. Subepicardially the coronary branching is attended by vast fat depots. However, intramurally it is free from adipocytes.*

**Keywords:** light microscopy, adipose tissue, coronary arteries, myocard, rabbit